

Congenital Talpes Equinovarus: (Clubfoot)

Congenital: Presented since birth

Talpus: Latin word compounded from talus (ankle) + pes (foot)

Equino: Fixed Planter flexion

Varus: heel (calcaneus) is turned inward

Incidence:

- 1/1000 live births (Caucasians), More in Chinese & Japanese, less in Hawaiians
- ♂ : ♀ → 2 : 1
- 50% Bilateral

Etiology: Unknown

Theories:

1-Neurogenic causes

-Histochemical abnormalities in the nerve -35% incidence in Spina Bifida

2-Myogenic causes: Increased type 1 (slow twitches) muscle fibers

3-Extrinsic causes:

•Teratogenic agents e.g. Sodium aminopterin •Oligohydramnios •Congenital constriction bands/ ring

4-Genetic causes

-Mendelian inheritance -Cytogenetic abnormalities

-Multifactorial inheritance: •1st degree relatives→ 2% •1 affected child→ 1-5%
•Affected parent, child→ 10-25% •1 Twin → 2nd Twin→ 32%

-Associated:

-Spina Bifida -Dawn's syndrome -Diastrophic dwarfism
-Arthrogryposis -Congenital myopathy -Fetal alcohol syndrome

Deformity: (mnemonic: CAVE)

C: Cavus→ High arched foot

A: Adduction of the forefoot (Metatarsals + Phalanges) → at the level of midtarsal joint

V: Varus → Internal rotation of the heel → at the level of subtalar joint

E: Equinus → Fixed flexion of ankle joint → at the level of ankle joint

Bony Deformity:

- Forefoot: Adduction & supination - Flexed 1st metatarsal - Cavus
- Hindfoot: equinus & varus
- Calcaneus: Medial rotation, equinus & varus
- Talus: Talar neck medially rotated, planter deviation + External rotation of body in ankle mortise
- Navicular/ Cuboid: medial displacement

Soft tissues Deformity:

- Muscles shortened & contracted:
(Tendon Achilles – Tibialis posterior – Flexor Hallucis Longus – Flexor Digitorum Longus)
- Tendon sheaths thickened: esp. Tibialis posterior
- Joints capsules contracted (resistant): Ankle – Subtalar – Talonavicular – Calcaneonavicular
- Ligament contracted: Calcaneofibular – Talofibular – Deltoid
- Fascia contracted: Planter fascia & facial planes of the foot

Classification:

1-Postural: assoc. usually with oligohydramnios, can be corrected at once, no need for treatment

2-Fixed: cannot be corrected at once, need treatment and it may be flexible or resistant

Assessment:

1-Full History (including gestational history)

2-Full patient examination: •Associated anomalies •Hips •Neurological
•Foot Scoring: Pirani – Diméglio

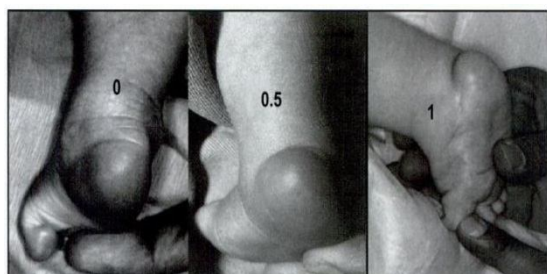
3-CTEV assessment

***Pirani Severity Scoring: (By Shafique Pirani)**

-6 Clinical Signs: 3→ Hind foot 3→ Forefoot

-Score: 0→ No abnormality 0.5→ Moderate abnormality 1→ Severe abnormality

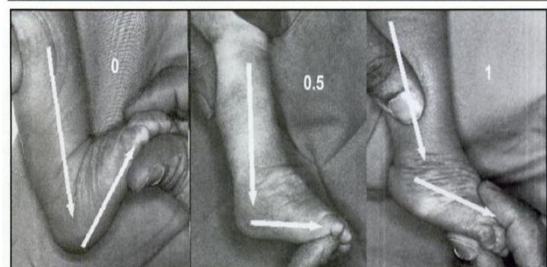
A) Hind foot		
1-Posterior Crease	0	Posterior ankle skin shows multiple fine creases
	0.5	One or Two deeper creases
	1	Single deep crease that changes the contour of the heel
2-Empty Heel	0	Calcaneus is immediately and superficially palpable
	0.5	Calcaneus palpable only deeply within the head pad
	1	Examining finger cannot palpate any bone
3-Rigid Equinus	0	Ankle dorsiflexion at least 15°
	0.5	Ankle dorsiflexion to neutral
	1	Ankle does not reach neutral
B) Fore foot		
1-Medial Crease	0	Multiple fine skin lines do not alter the contour of the arch
	0.5	One or more deeper creases
	1	Single deep crease that changes the contour of the arch
2-Curvature of lateral border	0	Straight lateral border from the heel to the 5 th metatarsal head
	0.5	lateral border moves away from straight edge at level of the prox. metatarsals
	1	Foot moves away from straight edge at the level of calcaneocuboid joint
3-Talar Head Palpability	0	With foot abduction, navicular reduces completely over talar head (not palp.)
	0.5	Navicular starts to reduce onto the head of talus but only partially covers it
	1	Navicular does not reduce over talar head at all when the foot is abducted



Posterior
Crease



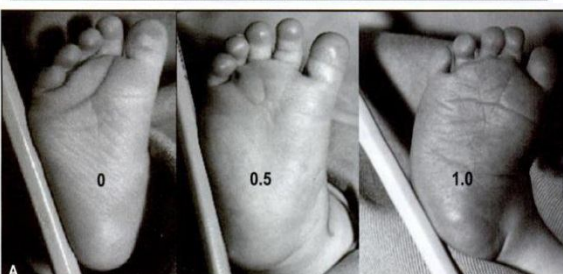
Empty
Heel



Rigid
Equinus



Medial
Crease



Curvature
of lateral
border



Talar Head
Palpability

Imaging:

1-Prenatal imaging

2-X-Ray:

a-AP

-Talocalcaneal Angle (Kite's Angle): (A)

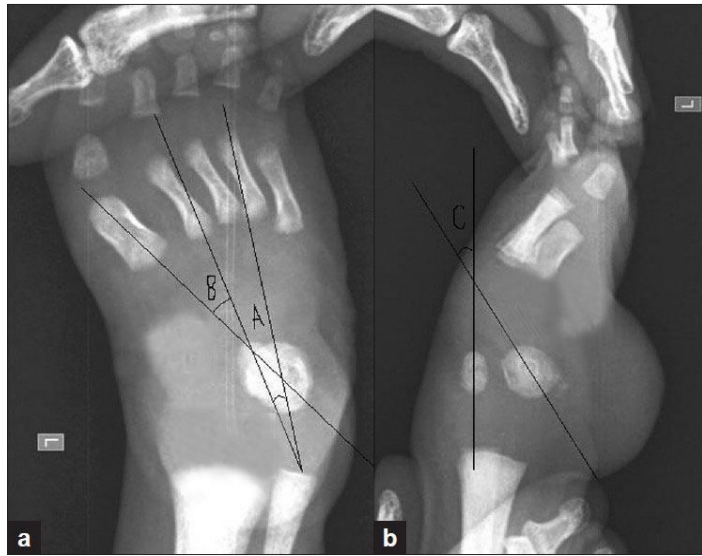
Normal $\rightarrow 20 - 40^\circ$, In CTEV $\rightarrow \downarrow$

-Talo - 1st metatarsal angle: (B)

Normal $\rightarrow 0 - 20^\circ$, In CTEV $\rightarrow \downarrow$ (-ve)

b-Forced Dorsiflexion lateral: (Turco) (C)

-Talocalcaneal angle $< 35^\circ$



Treatment:

Aim: 1-Correct deformity early & fully 2-Hold correcting until growth stops

Options:

1-Conservative: Serial casting – Posneti technique

2-Surgical: Soft tissue releases – Osteotomy – Tendon transfer – ilizarov frame

Posneti Technique: (1st Line of TTT)

Based on clinical and experimental work on “crimped” collagen fibers

1-Serial manipulations and casting

2-Change cast every week (average 5 casts)

3-Correct cavus then adduction and finally equinus

± 4-Percutaneous Achilles tenotomy under local anesthesia (in 90% of cases in which equinus isn't corrected by casting only) then put in Posneti plaster for 3 wks

5-Post cast bracing to maintain correction:

• To age 3 – 4 years • Use well-fitted, open-toed, high-top straight-last shoes attached to bar

• At 1st 3 months \rightarrow 23 hrs / day then 12 hrs at night & 2-4 hrs at day time

• If bilateral put both feet in 70° , if unilateral put the affected in 75° & the normal in 45°

*Relapses occurs due to **NON COMPLIANCE**

Surgical:

Indications:

1-Failed non operative 2- The child is of sufficient size to enable anatomy to be recognized

3-Complex Deformity

Surgical options by age:

1- < 5 years \rightarrow Soft tissue procedure (Posteromedial release)

2- 5 – 10 years \rightarrow Calcaneal Osteotomy

3- > 10 years \rightarrow Triple arthrodesis - Lateral wedge tarsectomy

Incisions:

1-Cicinnati \rightarrow Circumferential 2-Hockey Stick: (Posteromedial)

3-Carroll: 2 incisions (Medial + Posterolateral)

Complications of Surgery:

1-Overcorrection 2-Talar AVN 3-Persistent intoeing 4-Stiffness 5-Wound problem

Alternative:

Ilizarov fixator, may be used primarily, usually for complex deformities (neglected) & recurrent cases

